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ence of mineralogy is added to the list, the eminence which you have attained is quite exceptional.

It is gratifying to know that your services to the cause of science have obtained full recognition from teachers and students of science and from learned bodies in all civilized countries. None will question that the honors which have thus been so abundantly bestowed and so modestly received are well deserved. The consciousness that the motive of your researches has been an unalloyed love of truth and an unselfish desire to enlarge the bounds of human knowledge must give to these testimonials all the value that such marks of honor can ever possess. We congratulate you that your academic relations both with fellow-professors and with pupils have been so uniformly pleasant. The classes which, in long succession, have listened to your instructions, could their voices be heard, would unite in expressions of sincere respect both for the qualities of character and for the talents and learning of their revered instructor. But it is no part of our purpose to enter into a detailed statement of the reasons which render it peculiarly agreeable for us, your old friends and neighbors, to offer to you to-day our heartfelt congratulations. Had it been thought worth while to extend the list of subscribers to this letter, no doubt all the members of the teaching body in the University would gladly have added their names.

But our communication is simply intended as an expression, from a few of your older associates, of interest in this anniversary and of our earnest hope that the blessing of a kind Providence may continue to be with you and with the members of your family.

Very sincerely yours,

TIMOTHY DWIGHT, GEORGE E. DAY,  
GEORGE P. FISHER, GEORGE J. BRUSH,  
WILLIAM H. BREWER, O. C. MARSH, FRANK-

LIN B. DEXTER, EDWARD E. SALISBURY,  
WILLIAM D. WHITNEY, HUBERT A. NEW-  
TON, SAMUEL W. JOHNSON, DANIEL C.  
EATON, A. E. VERRILL, ADDISON VAN  
NAME, SIDNEY I. SMITH.

#### CORRESPONDENCE.

##### THE DISTRIBUTION OF SLEDGES, ETC.

DID anybody ever read or hear of sledges, snowshoes or goggles for the eyes in aboriginal South America? I have traced the skee entirely across Asia, the netted snow shoe from the Amur around to Klamath river, Cal., with extension throughout Canada, New England and our northern tier of States. The ice creeper for the foot covers the region of my migration track from southern Kamchatka around to the Yukon. The built-up sledge is everywhere in the Hyperborean area of two hemispheres, the form depending on the exigencies of timber growth. The great broad skee or snow shoe of the Amur is the flat toboggan of the Dominion of Canada.

OTIS T. MASON.

U. S. NATIONAL MUSEUM, April 20.

#### SCIENTIFIC LITERATURE.

*Memoir of Sir Andrew Crombie Ramsay.* By SIR ARCHIBALD GEIKIE, Director of the Geol. Surv. of Great Britain and Ireland. London and New York, Macmillan & Co. 1895. Pp. x + 397.

This is really a charming book and ought to be read not only by every geologist, but by every one interested in the story of a noble life. Indeed, the memoir of such a man as Ramsay by such a writer as Geikie could hardly be otherwise than deeply interesting.

Ramsay's career overlaps on the one hand with the old heroic days of the founders of English Geology—Lyell, Buckland, Sedgwick, Murchison, De la Beche, etc., and on the other with modern times and modern methods. He shared with the former the

enthusiasm of grappling with the great general problems of geology; but he himself did much to introduce and urge forward the more accurate methods, if less daring theories, of modern times. The story of his forty year's connection with the British Survey, first as assistant and then as local director for England under De la Beche, then as local director of England and Scotland under Murchison, and finally as Director General himself, is literally a history of the Survey itself. The book is illuminated too and its value enhanced by the pictures of all the principal men of the Survey, whose work every geologist knows, but whose faces are now perhaps seen for the first time.

The story of Ramsay's career is also in no small degree the history of the development of geological science in England. For in the beginning he sat at the feet of the geological Gamaliels, imbibing their spirit, and at the end he gathered about himself all the most ardent and progressive spirits and guided their course. Many modern ideas he himself initiated, while others he carried forward with his characteristic ardor.

In this connection it is interesting to note, in the history of science, the transfer of study from the *remote* to the *near at hand*, from the *abstract* to the *concrete* and often from the *obscure* to the *obvious*. Thus the field of study was Astronomy before Geology, the Science of the Stars before the Science of the Earth. So also it was dead things before living things, and man last of all. This is doubtless mainly due to the fact that the nearest things and things most closely connected with our highest interests are also the most complex and most difficult to reduce to law. But this is not all. There is a fascination in the remote, the hidden and the obscure which piques our curiosity, while we neglect phenomena which lie on the surface and which therefore seem common and

trivial because we see them every day. The history of geology is an excellent illustration of this. The early geologists loved to speculate on the interior of the earth and its mysterious forces. Next rock strata, their positions, successions, foldings, faults, etc., engaged attention. In the meantime the surface configuration of the earth, mountains and plains, ridges and valleys, soils and underlying rock surfaces, in fact all the most obvious and obtrusive features were neglected. Now, the change from the study of interior structure alone to the study of surface configurations in relation to interior structures, one of the most fascinating branches of geology, took place during Ramsay's times, and he himself was one of the most active agents in bringing it about. From the first he was deeply interested in the agency of exterior forces as contrasted with interior forces; with destructive as contrasted with constructive agencies. Still later he became interested in the significance of soils and underlying rock surfaces. He it was, therefore, who first gave strong impulse to glacial geology in England. For the seed sown by Agassiz found, at first, but poor soil in England.

Again, it is instructive to note also the effect of physical environment on the course of geological science. The incessant beating of waves on the limited shore line of the 'tight little sea-girt island' of Great Britain, and the ravages produced by these attacks on some parts, early impressed the minds of British geologists with a strong sense of the *power of the sea*. In the study of erosion, therefore, all the early geologists, Ramsay among the number, attributed far too much to marine denudation, while rain and rivers were almost neglected as being of little importance in comparison. It was apparently for the same reason that the iceberg theory of glaciation took so firm a hold and was so hard to displace in England. It was only by travel on the conti-

ment of Europe, and especially in the Alps, that Ramsay was led to appreciate the great importance of rain and rivers, as compared with the sea, as a land-destroying and land-sculpturing agent; and of land ice as compared with floating ice as a glaciating agent. But his ardent, candid nature knew no half-measures. His conversion was complete, and some think that he even carried his later views on this subject somewhat too far.

The *work* of Ramsay is well known to geologists. But the readers of SCIENCE are not all geologists. It may be well therefore to briefly mention some of the main points on which he contributed to geological knowledge or modified the course of geological thought.

His greatest direct contribution to geological knowledge is undoubtedly that embodied in his admirable map of Wales. The problem of Wales had been attacked successively by Sedgwick, Murchison and De la Beche. But the work of the older geologists was far too cursory. Nothing but the most careful foot-by-foot mapping could unravel its intricate structure. This was first done by Ramsay, and he devoted a large portion of life to its completion. His map is a monument of industry combined with rare geological insight.

Again, he was undoubtedly one of the founders of the study of geographical forms in relation to geological structure. Surely this is one of the most fascinating departments of geology (or of geography, for it may be claimed by both). It is this which constitutes the chief charm of his admirable work on the 'Physical Geology and Geography of Great Britain.'

Again, he was the originator of the idea of other possible glacial periods in the history of the earth and especially of glaciation in Permian times. His ardent uniformitarianism naturally led him in this direction.

Again, finally, he was the originator of

the doctrine of the origin of lake basins by glacial erosion. It is possible that in the enthusiasm of the originator, he may have carried this idea a little too far; but it is a misrepresentation to say, as has been done, that he attributed *all* lake basins to this cause. His original paper was entitled 'Origin of *Certain* Lakes by Glacial Erosion.'

So much for Ramsay the geologist. But the greatest charm of the book is found in the vivid picture it gives of Ramsay the man; his intense interest in life in all its phases and in literature in all its departments; his large human sympathy, embracing alike all true men from the rudest country people in their sport and dances to the most eminent scientists in their discussions; his deep love of art, poetry and music; his ardor of temperament, showing itself alike in the intensity of his work and in his keen enjoyment of fun and frolic. I never saw Ramsay but once, viz., at the Montreal meeting of the A. A. A. S. in 1857, when he was in his prime. I remember well on the occasion of a geological excursion in the vicinity the rapid, eager way in which he scrambled over the rocks, hammer in hand, firing all of us with his own enthusiasm. Is it any wonder that he wore himself out prematurely? Although he lived to 77, yet he resigned and quit work ten years earlier, and was already an old man at 63.

In closing this brief account of Ramsay, I cannot do better than quote the closing words of the memoir itself, "But above and beyond the impress of his scientific achievements, Sir. Andrew Ramsay's high position among his contemporaries was largely determined by his individual personality. His frank, manly bearing, his well-cut features beaming with intelligence and a sweet childlike candor, his ready powers of conversation, his wide range of knowledge, his boyish exuberance of spirits, his simplicity and modesty of nature, his sterling integrity,

perfect straightforwardness and high sense of duty, his generous sympathy and untiring helpfulness, marked him out as a man of singular charm and endeared him to a wide circle of friends who, while they admired him for his genius, loved him for the beauty and brightness of his character."

But I cannot close this notice without a final word concerning the memoir itself as a work of art. What we wish to know of great men is not only their achievements, but also all, even the trivial details of their daily life; for these, more than aught else, show character. All things, great and small, must be brought together into a living whole. This Geikie has done in a masterly way. Journals of petty daily occurrences, narratives of more continuous work, discussion of important scientific problems, letters on all kinds of subjects to all sorts of people, some full of weighty scientific matters, some full of fun and jokes and humorous verse, some full of deepest filial or conjugal affection—all these are skillfully woven into a vivid picture of the man as he really lived. Happy is the man who shall have such a biographer.

JOSEPH LE CONTE.

*A Text-Book of Invertebrate Morphology.* By J. PLAYFAIR McMURRICK, M. A., Ph. D. New York, Henry Holt & Co. 1894.

In preparing this book the author has followed the zoölogical method, and has given us a succinct though general account of the morphology of the different 'types,' classes and orders of the animal kingdom; no special forms under each being described.

Speaking of the word 'type,' we much prefer the older terms, branch, sub-kingdom or phylum, to the rather meaningless word 'type;' the first and last terms being naturally suggested from the evolutionary point of view, the main sub-divisions of the animal genealogical tree being more

naturally referred to as branches or phyla. The increase in the number of 'types' from eight to twelve results from dividing the Vermes into several, such as the Platyhelminths, Nemathelminthes and Annelida, which the author regards as of the same rank as the Mollusca. The Arthropoda also, somewhat prematurely, we think, are divided into three types, viz.: Crustacea, Arachnida and Tracheata. That the division is somewhat artificial is indicated by the fact that *Limulus* is assigned to the Crustacea, though placed in an appendix, whereas it is plainly neither a genuine Crustacean nor a true Arachnid, and belongs to an independent phylum. And then if we begin thus to manufacture 'types' out of the Arthropoda and out of the Vermes, we can scarcely end at the point the author reaches.

In agreement with some German authors, the Echinodermata, written Echinoderma, are interpolated between the highly specialized Tracheata and the Protochordata. This seems to us in a text-book of this sort a shade objectionable, when we consider how closely allied to the lower worms, both in embryology and in some points in their adult structure, Echinoderms are. Of course this is a matter of individual opinion, but we should look for some expression of the reasons why they are placed so far away from worms, in a situation between such closely circumscribed and specialized groups as insects, and the Chordata. If the position assigned the Echinoderms is due solely to the resemblance of the *Tornaria* larvæ of *Balanoglossa* to the larvæ of Echinoderms, this seems a rather slight reason.

While the descriptions of the types and classes are evidently clear and accurate; though not always presented in simple Saxon words, the salient points of resemblance or difference do not seem in all cases successfully brought out. Thus in writing